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THE EFFECTS OF COOPERATIVE LEARNING METHODS ON ACHIEVEMENT, RETENTION, AND ATTITUDES OF HOME ECONOMICS STUDENTS IN NORTH CAROLINA

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The purpose of this study was to determine the effects of the cooperative learning approach of Student Teams-Achievement Divisions (STAD) on the achievement of content knowledge, retention, and attitudes toward the teaching method. Cooperative learning was compared to noncooperative (competitive) learning classroom structure using a quasi-experimental design. An achievement test, consisting of items from the state competency test-item bank for the course, and an attitude questionnaire were administered immediately following instruction on the unit of special nutritional needs. A retention test was administered three weeks following the achievement test. California Achievement Test scores and first semester grades in home economics classes were used as covariates to adjust for possible preexisting differences between the groups. Multivariate analysis of covariance showed no significant difference among the dependent variables (achievement and retention) between the teaching methods used. There was

also no significant difference in student attitudes toward the teaching methods.

Teachers have the option of structuring lessons competitively, individualistically, or cooperatively. The decisions teachers make in structuring lessons can influence students' interactions with others, knowledge, and attitudes (Carson, 1990; Johnson & Johnson, 1987). In a competitively structured classroom, students engage in a win-lose struggle in an effort to determine who is best (Johnson & Johnson, 1991). In competitive classrooms students perceive that they can obtain their goals only if the other students in the class fail to obtain their own goals (Johnson, Johnson, & Holubec, 1986). Students in independently structured classrooms work by themselves to accomplish goals unrelated to those of the other students (Johnson & Johnson, 1991). In a cooperative learning classroom students work together to attain group goals that cannot be obtained by working alone or competitively. In this classroom structure, students discuss subject matter, help each other learn, and provide encouragement for member of the group (Johnson, Johnson, & Holubec, 1986).

Cooperative learning, as an instructional methodology provides opportunities for students to develop skills in group interactions and in working with others that are needed in today's world (Carol, 1988; Imel, 1989; Kerka, 1990). According to Johnson and Johnson (1989), cooperative learning experiences promote more positive attitudes toward the instructional experience than competitive or individualistic methodologies. In addition, cooperative learning should result in positive effects on student achievement and retention of information (Dishon & O'Leary, 1984; Johnson & Johnson, 1990; Slavin, 1991). According to McKeachie (1986), students are more likely to acquire critical thinking skills and metacognitive learning strategies, such as learning how to learn, in small group cooperative settings as opposed to listening to lectures.

Theoretical Framework, Conceptual Base, and Related Literature

According to Slavin (1987), there are two major theoretical perspectives related to cooperative learning -- motivational and cognitive. The motivational theories of cooperative learning emphasize the students' incentives to do academic work, while the cognitive theories emphasize the effects of working together.

Motivational theories related to cooperative learning focus on reward and goal structures. One of the elements of cooperative learning is positive interdependence, where students perceive that their success or failure lies within their working together as a group (Johnson, Johnson, & Holubec, 1986). From a motivational perspective, "cooperative goal structure creates a situation in which the only way group members can attain their personal goals is if the group is successful" (Slavin, 1990, p. 14). Therefore, in order to attain their personal goals, students are likely to encourage members within the group to do whatever helps the group to succeed and to help one another with a group task.

There are two cognitive theories that are directly applied to cooperative learning, the developmental and the elaboration theories (Slavin, 1987). The developmental theories assume that interaction among students around appropriate tasks increases their mastery of critical concepts (Damon, 1984). When students interact with other students, they have to explain and discuss each other's perspectives, which leads to greater understanding of the material to be learned. The struggle to resolve potential conflicts during collaborative activity results in the development of higher levels of understanding (Slavin, 1990). The elaboration theory suggests that one of the most effective means of learning is to explain the material to someone else. Cooperative learning activities enhance elaborative thinking and more frequent giving and receiving of explanations, which has the potential to increase depth of understanding, the quality of reasoning, and the accuracy of long term retention (Johnson, Johnson, & Holubec, 1986). Therefore, the use of cooperative learning methods should lead to improved student learning and retention from both the developmental and cognitive theoretical bases.

Several studies have examined the effects of cooperative learning methods on student learning. Humphreys, Johnson, and Johnson (1982) compared cooperative, competitive, and individualistic strategies in science classes and found that students who were taught by cooperative methods learned and retained significantly more information than students taught by the other two methods. Sherman and Thomas (1986) found similar

results in a study involving high school general mathematics classes taught by cooperative and individualistic methods. Allen and Van Sickle (1984) used STAD as the experimental treatment in a study involving low achieving students. They found that the cooperative learning group scored significantly higher on a world geography test. Perrault (1982/1983) found that cooperative learning resulted in significantly higher achievement in industrial arts students at the knowledge and comprehension levels of Bloom's taxonomy, but not at the application level when compared to students taught by competitive methods. In a study in which nutrition was taught to both elementary and secondary students using a cooperative learning strategy, Wodarski, Adelson, Todd, and Wodarski (1980) found significant gains between the pretest and posttest scores. The researchers concluded that cooperative learning was an effective method of teaching nutrition. In a review of 46 studies related to cooperative learning, Slavin (1983) found that cooperative learning resulted in significant positive effects in 63% of the studies, and only two studies reported higher achievement for the comparison group. Johnson, Maruyama, Johnson, Nelson, and Skon (1981) conducted a meta-analysis of 122 studies related to cooperative learning and concluded that there was strong evidence for the superiority of cooperative learning in promoting achievement over competitive and individualistic strategies.

Johnson and Ahlgren (1976) examined the relationships between students' attitudes toward cooperation, competition, and their attitudes toward education. The results of the study indicated that student cooperativeness, and not competitiveness, was positively related to being motivated to learn. Humphreys, Johnson, and Johnson (1982) also found that students studying physical science in a cooperative learning treatment group rated their learning experience more positively than did students in competitive and individualistic treatment groups. Tjosvold, Marine, and Johnson (1977) found that cooperative learning strategies promoted positive attitudes toward both didactic and inquiry methods of teaching science, and students taught by cooperative strategies believed they had learned more from the lesson than did students taught by competitive strategies. In a study involving elementary and secondary students who were taught nutrition, Wodarski, et al., (1980) found that 95% of the elementary students enjoyed the cooperative learning activities and that they had learned a lot about nutrition.

Statement of the Problem

While cooperative learning as an instructional methodology is an option for teachers, it is currently the least frequently used (Johnson & Johnson, 1991). More than 85% of the instruction in schools consists of lectures, seatwork, or competition in which students are isolated from one another and forbidden to interact (Johnson, Johnson, Holubec, & Roy, 1984). Goodlad (1984) reported that most classroom time is spent in "teacher talk", with only 1% of the students' classroom time used for reasoning about or expressing an opinion.

Group work has been used extensively in home economics to provide practice in acquiring both competence and skills in interpersonal relations. The introduction of cooperative learning strategies in home economics has potential for improving the group activities commonly used in these classes (Hall & Paolucci, 1972). While empirical evidence supports the use of cooperative learning with a variety of subject areas and age groups, the extent to which these methods are beneficial in home economics education is unknown. Without empirical evidence to support the effectiveness of cooperative education in home economics, it is likely to be ignored as an instructional methodology by home economics educators.

The purpose of this study was to determine the effects of the cooperative learning approach of Student Teams-Achievement Divisions (STAD) on the achievement, retention of information, and attitudes toward the instructional method of selected home economics students. The following research questions provided the specific focus for the study:

1. Was there a difference in achievement, as measured by the researcher developed achievement test for students who have been taught by the cooperative learning method, STAD, and those who were taught by noncooperative methods?
2. Was there a difference in retention of information, as measured by the researcher developed retention test administered three weeks after the end of instruction for students who have been taught by the cooperative learning method, STAD, and those who were taught by noncooperative methods?

3. Was there a difference in the attitudes toward the teaching method used for students who have been taught by the cooperative learning method, STAD, and those who were taught by noncooperative methods?

Research Methods and Procedures

The population for this study consisted of home economics students enrolled in a Food and Nutrition course in high schools in the central region of North Carolina. Four schools that offered two or more sections of the food and nutrition course agreed to participate in the study. The design of study was quasi-experimental with 91 students in the cooperative learning (STAD) group and 106 students in the non-cooperative learning group. According to [Hays \(1973\)](#), samples of this size would allow the researchers to detect differences between the treatment groups larger than 0.50 standard deviations at an alpha level of .05 and a desired power of .90. Once classes from each participating school were identified, they were randomly assigned to cooperative and noncooperative treatment groups.

In order to account for possible pre-existing differences in overall ability between the treatment groups, California Achievement Test scores and first semester grades in home economics were used as covariate measures. In order to control for the "teacher quality" variable, both groups were taught by the regular home economics teachers who were provided inservice in the use of STAD by an expert on cooperative learning. Teachers were also provided detailed instructions for conducting learning activities in both the cooperative and noncooperative groups. Both groups were taught the nutrition unit using the same content outline, but students in the cooperative learning group completed learning activities in small heterogeneous groups, while the students in the non-cooperative group completed activities individually. The unit was taught to both groups over a two-week period.

An instrument to measure student achievement and retention was developed from items related to the unit of instruction in the state-adopted competency test-item bank. Content validity of the items was assessed at the time they were developed for the test-item bank, and was verified by home economics teachers, a home economics teacher educator, and a state consultant for home economics. Items related to each instructional objective were selected for the instrument. The instrument was pilot tested to establish reliability in a school not selected to participate in the study. The Kuder-Richardson coefficient of internal consistency for the instrument was .87. The test was administered to both groups at the end of the instructional unit. Three weeks later, the test was administered again to the students to determine retention of information.

The instrument used to measure attitudes toward the method of instruction was developed and used in a similar study by [Flowers \(1986/1987\)](#). Content validity of the attitude instrument was established by faculty at the University of Illinois who had expertise in the development of attitude instruments. The instrument had a coefficient of internal consistency (Cronbach's Alpha) of .89. The attitude instrument was administered at the end of the unit of instruction.

Findings and Conclusions

Preliminary analyses of covariate measures (California Achievement Test scores and average grade in home economics) showed that students in the treatment groups were not significantly different (see Table 1). Moderate relationships, with correlation coefficients ranging from .29 to .54, were found between the covariate measures and the dependent variables of achievement and retention. These relationships supported the use of the covariate measures used in this study.

Table 1
Comparison of CAT Scores and Home Economics Grade by Teaching Method

		CAT		Average	grade
Method	n	M	SD	M	SD

Cooperative	87	741.33	30.21	79.92	9.58
Noncooperative	106	741.55	29.36	82.30	10.23
	$t = 0.05$	$p = .96$		$t = 1.67$	$p = .10$

Student achievement was measured by the number of correct responses on the 33-item achievement test developed by the researchers. The mean scores for the treatment groups were adjusted by the covariate measures to statistically control for preexisting differences. The adjusted mean score for the cooperative learning group was 19.61, while the adjusted mean score for the noncooperative treatment group was 19.52 (see Table 2). The test of retention was administered three weeks following the achievement test. The adjusted mean score for the cooperative learning group on the retention test and the noncooperative group were very similar.

Multivariate analysis of covariance (MANCOVA) was used to analyze the data related to the dependent variables of student achievement and retention of information. MANCOVA showed no significant difference among the dependent variable between the teaching methods used [Hotelling's $T = .00015$, $F(2, 18) = 0.14$, $p = .99$]. Since the multivariate analysis showed no difference between the treatment groups, no further analyses were performed related to student achievement or retention.

Table 2
Mean Student Achievement and Retention Scores by Teaching Method

		Achievement Test		Retention Test	
Method	n	Observed mean	Adjusted mean	Observed mean	Adjusted mean
Cooperative	90	19.38	19.61	18.27	18.49
Noncooperative	104	19.75	19.52	18.63	18.41

Student attitude toward the teaching method was not included in the multivariate analysis because it was not assumed to be correlated with the other dependent variables. Pearson product moment correlation coefficients of .06 and .10 confirmed that student attitudes were not related to achievement or retention, respectively. The mean attitude score for students in the cooperative learning group was 81.45 ($sd = 15.96$), while the mean score for students in the noncooperative group was 77.00 ($sd = 15.21$). A t -test showed no significant difference in attitudes toward the teaching method between the groups ($t = 1.84$, $df = 164$, $p = .07$).

Based upon the findings of this study, the following conclusions were drawn:

1. The cooperative learning approach is no more or less effective than the noncooperative learning approach with regard to home economics student achievement or student retention of information.
2. The cooperative learning approach is no more or less effective than the noncooperative learning approach with regard to home economics students' attitudes toward the method of instruction.

Implications and Recommendations

While cooperative learning was not found to be more effective than noncooperative learning with respect to home economics students' achievement and retention in this study, the literature suggests there may be

additional reasons to use cooperative learning. Certainly, the ability to work with others within a group and to develop interpersonal skills may be justification for using cooperative learning strategies. This study has shown that cooperative learning methods were as effective as noncooperative methods with regard to achievement and retention, so concerns about the effectiveness of cooperative learning methods in these areas have been addressed. Students taught by cooperative methods should perform equally as well as students taught by noncooperative methods. In addition, student attitudes toward cooperative learning are similar to noncooperative learning.

Additional research should be conducted to increase the generalizability of the findings to home economics education. Studies in which cooperative learning strategies are used for a semester or an entire year should be conducted to determine if student achievement is increased with additional experience in using cooperative learning. Future research should also focus on comparisons between different models of cooperative learning, as well as comparisons with noncooperative learning approaches in order to determine if other cooperative learning models are equally effective in producing desired student outcomes.

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